



## PATENT ABSTRACTS OF JAPAN

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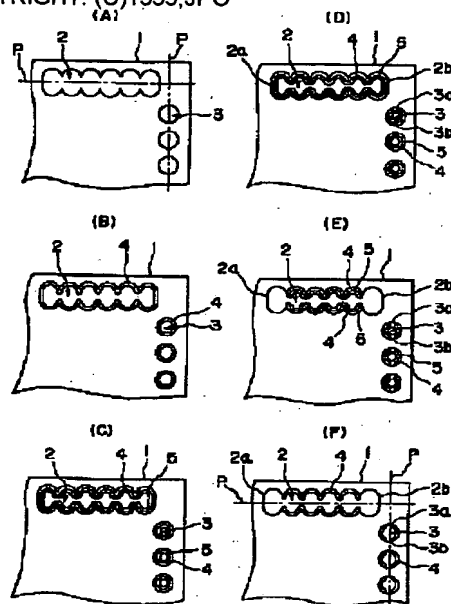
**H05K 3/40**(21) Application number: **09337051**(22) Date of filing: **08.12.97**(71) Applicant: **CMK CORP**(72) Inventor: **ICHIKAWA JUNICHI  
HIRANO MINORU****(54) MANUFACTURE OF PRINTED WIRING BOARD****(57) Abstract:**

**PROBLEM TO BE SOLVED:** To prevent burr or peel-off of a copper plating at working, by electro-depositing a photosensitive etching resist film on the surface of a copper plating layer of a through hole of a substrate, and exposing/developing and etching a part of it, in axial direction, at a facing inner wall part of the through hole crossing an outline cutting line, for removal.

**SOLUTION:** On both front and rear surfaces of a board 1 and inner wall surfaces of a slot 2 and a round hole 3, a copper plating layer 4 is formed, and a photosensitive etching resist film 5 is electro-deposited on the surface of them. Then, at facing inner wall parts of the slot 2 and the round hole 3 crossing an outline cutting work line P, a part of the electro-deposition photosensitive etching resist film 5 is exposed/developed by an appropriate width in axial direction. Then etching is processed in axial direction for a part of it to be removed. Then, by peeling the photosensitive etching resist film 5, a printed wiring board comprising a connection end surface formation through hole in such condition as a part of it is removed in axial redirection at the facing inner wall parts where the copper plating of the slot 2 and the

round hole 3 crosses the outline cutting work line P is provided.

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**Notes:**

1. Untranslatable words are replaced with asterisks (\*\*\*\*).
2. Texts in the figures are not translated and shown as it is.

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**CLAIMS**

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**[Claim(s)]**

[Claim 1] The process which electrodeposits the photosensitive etching-resist film in the coppering layer surface concerned of the substrate which has the through hole where the coppering layer was formed in the internal surface, The process which exposes and develops a part of electrodeposited photosensitivity etching-resist film concerned in shaft orientations in the opposite wall section of a through hole which crosses an appearance cut processing line, The manufacture method of a printed wired board of having the through hole for end-connection side formation characterized by including the process concerned which carries out after [ exposure / development ] etching processing, and removes the coppering of a through hole in part to shaft orientations in the opposite wall section concerned.

[Claim 2] The printed wired board according to claim 1 characterized by the through hole for end-connection side formation being a round hole, an angle hole, or a slot.

[Claim 3] The printed wired board according to claim 2 characterized by being formed of the radii which the slot followed.

[Claim 4] [ the electrodeposited process of said photosensitive etching-resist film, exposure and the developing process of said electrodeposited photosensitivity etching-resist film, and said etching down stream processing ] The manufacture method of the printed wired board of Claim 1 -3 characterized by carrying out with the electrodeposited process of the photosensitive etching-resist film for circuit formation, exposure and the developing process of the electrodeposited photosensitivity etching-resist film, and etching down stream processing, respectively given in any 1 term.

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**DETAILED DESCRIPTION**

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**[Detailed Description of the Invention]****[0001]**

[Field of the Invention] This invention relates to the manufacture method of a printed wired board, especially the printed wired board which has the through hole in which an end-connection side is formed of appearance cut processing.

**[0002]**

[Description of the Prior Art] Conventionally, generally, after the printed wired board which has a connecting face in an end face formed the coppering layer in the through hole internal surface, it was

manufactured by cutting the through hole located on an appearance cut processing line in router processing etc. However, when based on this method, the actual condition was difficult to obtain the printed wired board which coppering was turned over at on the occasion of the appearance cut processing concerned, was easy to produce \*\*\*\*\*, and was excellent in end-face precision.

[0003] Then, after turning over the coppering concerned and forming a coppering layer for the purpose of prevention of \*\*\*\*\* in recent years, The method of making it filled up with the matter with which a printed wired board construct differs from fusion nature in a through hole, carrying out appearance cut processing with the packing state, and removing packing after that is already reported (JP,H4-247693,A). however, as a result of adding further 2 processes at least in the production process of the usual printed wired board since the removal process of packing is needed like the foreign matter packer into a through hole when based on this method, there was a problem which efficient production calls difficulty.

[0004]

[Problem to be solved by the invention] This invention is made in view of the conventional actual condition and the conventional problem like the above. It aims at offering the method of manufacturing efficiently, without adding a routing counter for the printed wired board which has the through hole for end-connection side formation which coppering is turned over and \*\*\*\*\* does not produce in the case of appearance cut processing exceptionally.

[0005]

[Means for solving problem] The process to which this invention electrodeposits the photosensitive etching-resist film in the coppering layer surface concerned of the substrate which has the through hole where the coppering layer was formed in the internal surface in order to attain the above-mentioned object, The process which exposes and develops a part of electrodeposited photosensitivity etching-resist film concerned in shaft orientations in the opposite wall section of a through hole which crosses an appearance cut processing line, The manufacture method of a printed wired board of having a through hole for end-connection side formation according to the process concerned which carries out after [ exposure / development ] etching processing, and removes the coppering of a through hole in part to shaft orientations in the opposite wall section concerned is constituted.

[0006] Since the coppering of the appearance cut processing part of a through hole is exactly removable according to this composition, in the case of appearance cut processing, the conventional \*\*\*\* coppering is turned over and \*\*\*\*\* does not arise. [ moreover, the electrodeposited process of said photosensitive etching-resist film, exposure and the developing process of said electrodeposited photosensitivity etching-resist film, and said etching down stream processing ] By carrying out with the electrodeposited process of the photosensitive etching-resist film for circuit formation, exposure and the developing process of the electrodeposited photosensitivity etching-resist film, and etching down stream processing, respectively The printed wired board which has an end-connection side through hole can be manufactured efficiently, without adding a routing counter exceptionally.

[0007] [ considering it as the slot formed with the continuous radii, although a round hole, an angle hole, a slot, etc. do not ask how of the concrete configuration as a through hole in this invention / with existence of the projection wall section in the articulated section of the radii concerned ] Since it can prevent that a light excessive in the case of exposure of the electrodeposited photosensitivity etching-resist film turns even to an exposure garbage As a result of the field where the punch of metal mold

touches (it hits) decreasing when performing appearance cut processing by press punching processing while higher-precision exposure and development become possible, it is advantageous at especially the point that can reduce the load at the time of punching more.

[0008] Moreover, although how of a positive type and a negative mold is not asked as said photosensitive etching-resist film used for this invention, thickness is thin and it is desirable that excel in sensibility and tuck nature moreover uses a positive type especially at few points.

[0009]

[Mode for carrying out the invention] The gestalt of operation of this invention is explained with Drawings below.

[0010] The flat-surface explanatory view in which (A) - (F) of drawing 1 shows the procedure of the production process of the printed wired board of this invention, As (a) - (f) of drawing 2 is the cross-sectional explanatory view which is along the appearance cut processing line of the round hole section corresponding to (A) - (F) of drawing 1, respectively and it is first shown in drawing 1 (A) and drawing 2 (a) Number assemblage of the slot 2 and round hole 3 which are formed of a drilling opium poppy and the continuous radii with a drill on the appearance cut processing line P of a substrate 1 is carried out suitably.

[0011] Subsequently, as shown in drawing 1 (B) and drawing 2 (b), the coppering layer 4 is formed in rear surface both sides of a substrate 1, and the internal surface of a slot 2 and a round hole 3.

[0012] Subsequently, as shown in drawing 1 (C) and drawing 2 (c), the photosensitive etching-resist film 5 is electrodeposited on the coppering layer 4 surface of a substrate 1 and a slot 2, and a round hole 3.

[0013] Subsequently, as shown in drawing 1 (D) and drawing 2 (d), said a part of electrodeposited photosensitivity etching-resist film 5 is suitably exposed and developed by width in shaft orientations in the opposite wall section 2a of the slot 2 and round hole 3 which cross the appearance cut processing line P, 2b;3a, and 3b. Incidentally this exposure and development are performed simultaneously with the exposure and the development for circuit formation.

[0014] Subsequently, as shown in drawing 1 (E) and drawing 2 (e), etching processing is carried out and the coppering of a slot 2 and a round hole 3 is removed in part to shaft orientations in the opposite wall section 2a, 2b;3a, and 3b. Incidentally this etching processing is performed simultaneously with the etching processing for circuit formation.

[0015] Subsequently, if the photosensitive etching-resist film 5 is exfoliated as shown in drawing 1 (F) and drawing 2 (f) The printed wired board which has a through hole for end-connection side formation in the state where the coppering of a slot 2 and a round hole 3 was removed in part in shaft orientations in the opposite wall section 2a which crosses the appearance cut processing line P, 2b;3a, and 3b (a slot 2 and round hole 3) is obtained.

[0016]

[Effect of the Invention] While the coppering of the appearance cut processing part of the through hole for end-connection side formation is exactly removable according to the manufacture method of the printed wired board of this invention The printed wired board which has the through hole for end-connection side formation where coppering does not exist in an appearance cut processing part can be manufactured efficiently, without adding a routing counter exceptionally.

[0017] It \*\*, and since coppering does not exist in the appearance cut processing part of the through hole for end-connection side formation if the printed wired board manufactured thus is used, the

printed wired board which coppering is turned over by appearance cut processing, and \*\*\*\*\* does not arise, and has an end face with high connection dependability can be obtained.

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[Translation done.]